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Educational Attainment Effects of Public and Private School Choice

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Educational Attainment Effects of Public and Private School Choice

Abstract

The two fastest growing school choice options are charter schools and private school voucher programs (independently, as tax credit scholarships, and as part of educational savings accounts). Most of the research assessing the effects of these programs focuses on student achievement. I review the literature to determine the impact public and private school choice programs are having on high school completion, college enrollment, and college persistence which, ultimately, may be different and of greater consequence than test scores. Furthermore, as educational attainment affects earnings and other life outcomes, those findings are reported when available. In sum, of the 12 studies presented it appears that school choice programs are having a positive effect on educational attainment overall, with similar results for both types of choice programs. However, there is too little research to draw firm conclusions at this time.

Key words: School choice, charter schools, private school voucher

Educational Attainment Effects of Public and Private School Choice

Over the past 25 years, dissatisfaction with the public education system in the U.S. has led to an increase in school choice policies. Of the choice options available, the two fastest growing are charter schools and private school voucher programs (independently, as tax credit scholarships, and as part of educational savings accounts (ESA)). Most of the research assessing the effects of these programs focuses on student achievement based on annual assessment scores. The empirical studies have primarily used either experimental randomized control trials (RCT), taking advantage of over-subscription, or quasi-experimental matching methods.

A meta-analysis of the literature on the effects of charter schools on student achievement by Betts and Tang (2014) indicates that the average effect of charter schooling in general is modest. Overall, charter schools are performing better in math than traditional public schools in most grades, with middle schools producing the largest gains. The impact of charter school enrollment on reading achievement appears to be positive but statistically insignificant on average, though this appears to be driven by a few studies with large negative estimated effect sizes. Impacts in the charter sector vary considerably, in particular across geographic areas, with larger and more consistent positive achievement benefits for urban charters, especially with disadvantaged populations of students.

A recent review of the empirical research on private school choice programs by Egalite and Wolf (2016) found effects similar to the studies on charter schools. Overall, the results of voucher programs are mixed, with null to moderate estimated effects on math and reading achievement, and more consistent benefits for African American students. However, impacts also vary largely based on geographic area and program design.

While measuring the effects of choice programs on test scores is important, it may not capture the full scope of the impact these programs have on students. Non-test score outcomes such as high school graduation, college enrollment and persistence may be different and of greater significance than test scores. Furthermore, test scores may not be a good way to compare public and private schools with different curriculum alignment, differing stakes attached to assessments, and varied experience with test administration. Additionally, research has shown that individuals with more education have greater employment opportunities and earn more income, both annually and over their lifetime (Becker, 1993; Day & Newburger, 2002; Griliches & Mason, 1972; Heckman et al., 2008). More educated individuals are healthier, have greater longevity, contribute more in tax revenues, and are less likely to commit crime (Belfield & Levin, 2007; Deming, 2011; Levin et al., 2006). Researchers have begun to evaluate educational attainment outcomes for district-wide choice in Charlotte-Mecklenburg (Deming et al, 2014), groups of students in charter schools in Texas (Dobbie & Fryer, 2016), Florida (Booker et al., 2014; Sass et al., 2016), Chicago (Booker et al., 2014; Davis & Heller, 2015), Boston (Angrist et al., 2016), and for voucher programs in New York City (Chingos & Peterson, 2015; 2012), Milwaukee (Cowen et al., 2013; Warren, 2011), and Washington D.C. (Wolf et al., 2013).¹

¹ The research on educational attainment and long-term outcomes of education interventions and programs is limited. There is an older, mostly observational literature which generally found larger effects on attainment than on achievement. Studies examining the benefits from Catholic schooling found small benefits in achievement for students in general with more substantial impacts for minority and disadvantaged students (Jencks, 1985; Chingos & Peterson, 2012), and larger positive effects on the probability of high school completion and college enrollment, especially for urban minority students (Evans and Schwab, 1995; Neal, 1997; Altonji et al., 2005; Chingos & Peterson, 2012). Studies examining longer-term impacts have evaluated the Perry Preschool and Abecedarian programs (Almond & Curry, 2010; Heckman & Krueger, 2002; Chingos & Peterson, 2012), Job Corps (Burghardt et al., 2001; Chingos & Peterson, 2012), and a class size reduction intervention in Tennessee for grades K-3 (Dynarski et al., 2011; Chingos & Peterson, 2012).

The purpose of this review is to examine the impact public and private school choice programs are having on high school completion, college enrollment, and college persistence. These programs might have a different effect on attainment because they are providing students with skills, knowledge, work habits, motivation and values that are important for long-term success but are not fully captured by test scores. Additionally, impacts on attainment may further affect earnings and other life outcomes. After two decades, it is important to begin to assess the long-term impact these choice programs are having on students. I hope to contribute more information to the discussion, and to policy makers, on the effects and effectiveness of these programs.

Review of Literature

In reviewing the literature on the attainment effects of public and private school choice programs, I find that the literature is sparse. There are very few studies that examine high school graduation, college enrollment or college persistence as the focus of the research. In many cases, they are additional outcomes included in achievement studies. Searching the literature for studies related to educational attainment, high school graduation, college enrollment, or college persistence, and school choice, charter schools, or school vouchers, 12 papers were included in this review. Previous versions of studies and prior literature reviews were not included to reduce redundancy. Two recent papers begin to look at the long-term impacts of charter programs on earnings. As yet, there are no studies of voucher programs which look at earnings. In sum, I found one study of a public school choice program, seven studies of charter school programs, and four studies of voucher programs which included attainment.

It should be noted, that the analytic approaches used in the studies presented have different tradeoffs. While experimental (RCT) evaluations are likely to obtain unbiased estimates by taking advantage of over-subscribed admissions lotteries, such studies tell us little about programs without over-subscription. The effects of over-subscribed programs are not likely to be representative of the effects of similar choice schools across a district or state. Furthermore, while quasi-experimental matching studies allow for the inclusion of students in schools with and without admissions lotteries, they introduce the possibility of selection bias, leading to biased estimates of effects, as certain types of students may select into choice programs. While experimental studies are preferred, there are shortcomings to both types of design.

Public School Choice

Charlotte-Mecklenburg Schools implemented an open enrollment public school choice program in Fall 2002, in which all high school students were allowed to choose and rank up to three schools in the district (Deming et al., 2014). As with other choice programs, seats to over-subscribed schools were assigned by random lottery. As this is the only open enrollment school choice program with research on attainment effects, it is included here as more evidence of the impact of public school choice (Table 1). The authors find small, statistically significant increases in high school graduation (within 5 years), college attendance, and degree completion for students who win the lottery to their first choice school, with greater gains for girls. Girls were 14 percentage points more likely to complete a 4-year degree. There were no statistically significant estimated impacts for boys.

Table 1. Educational Attainment of *Public School Choice Programs*

		Evaluation					
Author(s)	Year	Location	Method	HS Graduation	College-Enrollment	College Persistence	Subgroups
Public School Choice (Open-enrollment District)							
Deming et al.	2014	Charlotte-Mecklenburg	RCT	Small, sig. increases in HS graduation (within 5 yrs), postsecondary attendance, and degree completion for students who win lottery to first choice school.	4 ppt increase in enrolling in "very competitive" colleges (Baron's).	60% increase in degree completion (from the mean).	Girls are 14 ppts more likely to complete a 4-yr degree.
Charter School Choice							
Angrist et al.	2016	Boston	RCT	No clear effect. Reduces 4 yr grad rate by 14.5 ppts but effect falls to a one percentage point reduction with 5 yr graduation.	Modest effects (insig) with shift from 2-yr (decreases by 11 ppts) to 4-yr institutions (increases by 13 ppts). Nearly half enroll in college in the fall after graduation, 60% within 18 months.	Increases the likelihood of persisting for three semesters at 4-yr schools by 12 ppts.	Larger effects for at-risk groups, including boys, special ed, and those who enter HS with low achievement.
Booker et al.	2014	Chicago & Florida	Matching	7-15 ppts more likely to graduate within 5 yrs (increases FL by 13%, CHI by 9%).	8-10 ppts more likely to enroll in any postsecondary institution within 6 yrs of starting high school (increases FL by 17%, CHI by 9%).	Increases 2-yr persistence for FL by 13 ppts (36%), CHI by 7 ppts (14%) (insig).	
Davis & Heller	2015	Chicago	RCT		7-9 yrs after lottery, winners are 10 ppts more likely to attend college and more likely to enroll immediately after graduating.	Winners are 9.5 ppts more likely to stay enrolled at least four semesters. (Small, insig. effect on degree completion of 0.7 ppts.)	
Dobbie & Fryer	2016	Texas	Matching	At the mean, charters are no more effective. Graduation increases by 1.2 ppts. (No Excuses increase by 2.5 ppts; regular charters by 0.4 ppts).	No Excuses schools increase 4-yr college enrollment; other charter schools decrease enrollment.	No Excuses schools increase persistence in 2-yr and 4-yr colleges.	No Excuses schools are particularly effective with minority students - more likely to graduate HS, enroll in 2-yr or 4-yr college.
Dobbie & Fryer	2013	New York City	RCT (Survey)	Regents exams for graduation - lottery winners pass one additional exam, score higher, and are more than twice as likely to take and pass more advanced exams.	14.1 ppts more likely to enroll in college in the fall after graduation; 21.3 ppts more likely to enroll in 4-yr college, 7.2 ppts less likely to enroll in 2-yr college.		
Furgeson et al.	2012	U.S.	Matching	6 CMOs - on average, increase probability of graduating by 7 ppts (but insig.)	4 CMOs - on average positive impact on enrollment of 13 ppts (but insig.)		

Table Key: Positive effects Mixed effects Null effects Negative effects

Note: All high school graduation results are based on administrative records.

Charter School Choice

Charter schools are public schools of choice which means they are open to all children, are tuition-free, and do not have entrance requirements. If they are over-subscribed, meaning they have more applications than seats available, they must hold lotteries for admission. Some schools are part of charter management organizations (CMOs) while others are “mom and pop”-type independent charter schools. The first charter school law was passed in Minnesota in 1991 (NAPCS, 2016). Currently there are more than 6,700 charter schools in 42 states and the District of Columbia (ibid).

Of the seven studies included assessing the attainment effects of charter schools in Table 1, three use experimental methods and four use quasi-experimental matching methods. The experimental studies examine charter schools in Boston (Angrist et al., 2016), Chicago (Davis & Heller, 2015), and New York City (Dobbie & Fryer, 2013). The matching studies look at charter programs in Texas (Dobbie & Fryer, 2016), Chicago and Florida (Booker et al., 2014; Sass et al., 2016)², and charter management organizations nationwide (Furgeson et al., 2012). Five of six studies include impacts on high school graduation, six studies include college enrollment, and four include college persistence. Two studies look at longer term impacts on earnings, and one presents information on risky behaviors and health outcomes.

High School Graduation. The effect of attending a charter school appears to have a null to positive impact on the likelihood of high school graduation. Three studies found positive effects, and two studies found null effects. Both the Boston experiment (Angrist et

² Sass et al. (2016) is an updated version of Booker et al. (2014), however, the Sass et al. paper focuses on earnings for the Florida sample so is also included.

al., 2016) and the Texas matching study (Dobbie & Fryer, 2016) found no clear effect on graduation rates. In the matching study of Chicago and Florida, charter students were 7-15 percentage points more likely to graduate high school (within 5 years) than their counterparts (Booker et al., 2014; Sass et al., 2016), and the CMO study found a 7 percentage point average increase in the probability of graduating (though not statistically significant) (Furgeson et al., 2012).

College Enrollment. Estimated effects on college enrollment also appear to be positive. Charter school students are more likely than traditional public school peers to enroll in college (Angrist et al., 2016; Davis & Heller, 2015; Dobbie & Fryer, 2013; Furgeson et al., 2012; Booker et al., 2014; Sass et al., 2016), enroll immediately after graduating (Angrist et al., 2016; Davis & Heller, 2015; Dobbie & Fryer, 2013), and attend a 4-year rather than 2-year institution (Angrist et al., 2016; Dobbie & Fryer, 2016; Dobbie & Fryer, 2013). The Boston study found larger estimated effects for special needs students, lower achieving students at baseline, and boys (Angrist et al., 2016). The Texas study saw greater impacts for “No Excuses”-type charter schools (Dobbie & Fryer, 2016).





College Persistence. The evidence on college persistence appears positive as well. The four studies that examine this all found that charter students were more likely to stay enrolled in college at least three semesters after graduation (Angrist et al., 2016; Davis & Heller, 2015; Dobbie & Fryer, 2013; Booker et al., 2014; Sass et al., 2016). One study looked at college matriculation but found no clear effect on degree completion (Davis & Heller, 2015).

Earnings and Other Future Life Outcomes. As noted earlier, two of the seven studies also examine outcomes on earnings and one explores the impacts on risky

behaviors and health outcomes. Findings for all of these outcomes are mixed. The Texas study found no measurable benefit to earnings or employment for students who attended a charter school (Dobbie & Fryer, 2016). In fact, “all charter students appear to be in lower paying industries” (p.23) compared to earnings in other industries (at the 25th, 50th, and 75th percentile). Contrary to this, the Florida study found that charter students had an earnings advantage, even among students who went to college; college attendance alone cannot explain the earning difference (Sass et al., 2016). Charter high school students had higher earnings than public school peers even if they did not attend college. It should be noted that these two matching studies used different models and samples which may account for the differing results.³

Table 2. Other Long-term Outcomes of *Public School Choice Programs*

			Evaluation	
Author(s)	Year	Location	Method	Other Long-term Outcomes
Charter School Choice				
Dobbie & Fryer	2016	Texas	Matching	Schools that decrease test scores or college enrollment also decrease earnings and employment; those that increase them demonstrate no measurable benefit. Positive correlation with HS graduation and labor market effects. All charter students appear to be in lower paying industries.
Dobbie & Fryer	2013	New York City	RCT (Survey)	Females 12.1 ppts less likely to be pregnant as teens, males 4.3 ppts less likely to be incarcerated. Similar drug, alcohol use and criminal behavior as lottery losers. Little impact on self-reported health - asthma, obesity, mental health.
Sass et al.	2016	Florida	Matching	Maximum annual earnings up to 12 years from initial enrollment in grade 8 (accounts for initial employment in temp jobs, early unemployment, or employment outside one's long-term profession) increases by \$4,400; 11-yrs increases earnings by \$2,200. Charter students have earnings advantage not explained by college attendance alone. Charter HS students have higher earnings even if they do not attend college.

Table Key:  Positive effects  Mixed effects  Null effects  Negative effects

Note: Sass et al. (2016) is an updated version of Booker et al. (2014), however, the Sass et al. paper focuses on earnings for the Florida sample so is included additionally.

³ Sass, et al. (2016) restrict the sample to students who attended a charter middle school in 8th grade and then compare traditional public high school attendees with charter high school attendees. In contrast, Dobbie & Fryer (2016) match on third grade school/race/gender and include all students, whether or not they ever attend a charter school.

Turning to the behavior and health outcomes, the New York City study found that girls who attended a charter school were less likely to become pregnant in their teens and boys were less likely to go to jail (Dobbie & Fryer, 2013). There was little difference in drug and alcohol use or criminal behavior between lottery winners and losers, or much of an impact on self-reported health.

Overall, charter school attendance appears to have positive effects on high school graduation, college enrollment, enrollment in 4-year institutions, and college persistence for at least three consecutive semesters. Impacts on earnings, and behavior and health outcomes are mixed. While most studies evaluated programs in urban settings, there is some variation in findings between geographic regions.

Private School Choice

Private school choice programs have historically been implemented in urban areas, with more recent growth in statewide programs (in particular as part of ESAs). School vouchers are state- or privately-funded scholarships that pay for students to attend private school rather than public school (NCSL, 2016). Most programs are means-tested programs, which means they are targeted to low-income students. These voucher programs benefit many students who attend chronically low-performing or failing public schools. The first modern voucher program was created in 1989 in Milwaukee, Wisconsin. Twenty-three states and the District of Columbia have school voucher programs⁴ (Egalite & Wolf, 2016; Frentheway et al., 2015).

⁴ While there are voucher programs in Maine and Vermont, they were established for students in towns that lacked public schools for their grade level, not to provide additional schooling options and thus are not included (Egalite & Wolf, 2016).

Only four studies assess educational attainment effects of private school voucher programs - one in New York City, the New York School Choice Scholarships Foundation Program (SCSF) (Chingos & Peterson, 2015; 2012); two in Milwaukee, the Milwaukee Parental Choice Program (MPCP) (Cowen et al., 2013; Warren, 2011)); and one in Washington, D.C., the District of Columbia Opportunity Scholarship Program (DCOSP) (Wolf et al., 2013). The studies on New York City and Washington, D.C. use experimental methods, while the Milwaukee studies use matching and observational methods. All but the New York City study include effects on high school graduation, and only two studies address college enrollment or persistence. No studies were found that examined earnings or other life outcomes.

High School Graduation. With the limited evidence presented in Table 2, there appears to be a positive impact on high school graduation rates for voucher students. Voucher students in Milwaukee were about 4 percentage points more likely to graduate in four years than their traditional public school counterparts (Cowen et al., 2013), and students in Washington, D.C. who used the voucher were 21 percentage points more likely to graduate compared to control group students (Wolf et al., 2013). Both studies found greater impacts for female students, and an increased probability of graduating for students from “Schools in Need of Improvement” who used the scholarship in the D.C. study (Cowen et al., 2013; Wolf et al., 2013).

Table 3. Educational Attainment of *Private School Choice Programs*

Author(s)	Year	Location	Evaluation Method	HS Graduation	College-Enrollment	College Persistence	Subgroups
Chingos & Peterson	2015	New York City	RCT		No significant effects on enrollment within 5 yrs of expected HS graduation (1.4 ppts, not sig).	No significant effects.	Large, marginally sig. impacts for minority students (African American, Hispanic); large, sig. impacts for children of U.S.-born women.
Cowen et al.	2013	Milwaukee	Matching	Voucher student graduation rate higher (74-76%) than TPS (69-72%) and more likely to graduate in 4 yrs, TPS in 5 yrs.	Less likely to attend 2-yr or technical college.	5 ppts more likely to attend or persist in 4-yr institution 4-5 years later.	African Americans considerably less likely to enroll or persist in college than non-African-Americans; female students more likely.
Warren	2011	Milwaukee	Observational	Higher graduation rate in 6-7 years; 12 ppts higher than state-wide graduation rate (82% compared to 70%, 2008-09).			Low-income school choice students 18% more likely to graduate from HS than students from across economic spectrum in TPS.
Wolf et al.	2013	Washington DC	RCT	Positive impact on HS graduation rates; voucher use raised probability of graduating by 21 ppts.			Students from "Schools in Need of Improvement" increased probability of graduating by 13 ppts if offered voucher, 20 points if used; students with higher levels of performance, increased probability by 14 ppts; for females, increased probability by 20 ppts.

Table Key: Positive effects Mixed effects Null effects Negative effects

Note: High school graduation results for Cowen et al. (2013) are based on administrative records and parent self-reports; Warren (2011) are based on administrative records; Wolf et al. (2013) are based on parent self-reports.

College Enrollment and Persistence. Effects on college enrollment and persistence are mixed, with only two studies to reference. The experiment in New York City found no statistically significant effects on either college measure (Chingos & Peterson, 2015; 2012), however, the matching study in Milwaukee found voucher students had a greater likelihood (5 percentage points) of attending and persisting in a 4-year institution 4-5 years later, and a lower likelihood of attending a 2-year or technical college (Cowen et al., 2013). While the New York City experimental study found null effects on college enrollment and persistence, it found large, marginally significant impacts for minority students (African American and Hispanic) and large, significant effects for children of U.S.-born women (Chingos & Peterson, 2015; 2012).

Overall, findings appear similar to those of charter school attainment. However, effects on high school graduation, college enrollment, and college persistence are inconclusive as there is not enough research to determine impacts. In sum, from the 12 studies presented it appears that school choice programs are having a positive effect on educational attainment overall. Evidence suggests similar results for both charter and private school choice programs. There are more studies which examine the effects of college enrollment and persistence for charter schools than for school voucher programs. However, there is very little research on the attainment effects of school voucher programs in general. More research is needed in this area overall.

Conclusion

School choice programs have been around for more than 25 years. Most research has focused on achievement effects. There is a dearth of literature on the educational attainment effects of school choice, particularly of private school choice. While a couple of

recent studies have begun to look at the long-term impacts of charter schools, very little attention has been paid to voucher programs. Quite simply, more research is needed.

There are a number of mature choice programs nationwide that have the long-term data needed to perform such evaluations. If we believe that students are learning skills, work habits, or values that do not translate into test scores but that might be more important for long-term success, we need to begin assessing whether that is the case (Greene, 2016).

Thus far, the limited evidence suggests that school choice has positive effects on attainment outcomes. Researchers need to examine longer term attainment effects of choice which include impacts on high school graduation, college enrollment, and college persistence, but also college degree attainment and earnings. There is too little research at present to draw firm conclusions on the effects of school choice on educational attainment.

References

- Almond, Jr. D., and Currie, J. (2010). Human Capital Development Before Age Five. *SSRN Working Paper No. 15827*. Available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1574646
- Altonji, J.G., Elder, T.E., Taber, C.R. (2005). Selection on Observed and Unobserved Variables: Assessing the Effectiveness of Catholic Schools, *Journal of Political Economy*, 113(1), 151-184.
- Angrist, J.D., Cohodes, S.R., Dynarski, S.M., Pathak, P.A., Walters, C.R. (2016). Stand and Deliver: Effects of Boston's Charter High Schools on College Preparation, Entry, and Choice, *Journal of Labor Economics*, 34(2), 275-318.
- Becker, G.S. (1993). *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*, 3rd edition. Chicago: University of Chicago Press.
- Belfield, C.R., & Levin, H.M. (Eds.). (2007). *The price we pay: Economic and social consequences of inadequate education*. Washington, D.C.: Brookings Institution Press.
- Betts, J., & Tang, Y. (2014). A meta-analysis of the literature on the effect of charter schools on student achievement. *Center on Reinventing Public Education*, Working paper.
- Booker, K., Gill, B., Sass, T., Zimmer, R. (2014). Charter High Schools' Effects on Long-Term Attainment and Earnings, *Mathematica Policy Research*, Working Paper.
- Burghardt, J., Schochet, P.Z., McConnell, S., Johnson, T., Gritz, R.M., Glazerman, S., Homrighausen, J., Jackson, R. (2001). *Does Job Corps Work? Summary of the National Job Corps Study*. Princeton: Mathematic Policy Research.
- Chingos, M.M. & Peterson, P.E. (2015). Experimentally Estimated Impacts of School Vouchers on College Enrollment and Degree Attainment, *Journal of Public Economics*, 122, 1-12.
- Chingos, M.M. & Peterson, P.E. (2012). The Effects of School Vouchers on College Enrollment: Experimental Evidence from New York City, *Brown Center on Education Policy at Brookings and Harvard Kennedy School*.
- Cowen, J.M., Fleming, D.J., Witte, J.F., Wolf, P.J., Kisida, B. (2013). School Vouchers and Student Attainment: Evidence from a State-Mandated Study of Milwaukee's Parental Choice Program, *The Policy Studies Journal*, 41(1), 147-168.
- Davis, M. & Heller, H. (2015). "No Excuses" Charter Schools and College Enrollment: New Evidence from a High School Network in Chicago. Available at *SSRN 2606059*.

- Day, J.C., & Newburger, E.C. (2002). The Big Payoff: Educational Attainment and Synthetic Estimates of Work-Life Earnings. Special Studies. Current Population Reports, *U.S. Census Bureau*.
- Deming, D.J. (2011). Better Schools, Less Crime? *The Quarterly Journal of Economics*, 126, 2063-2115.
- Deming, D.J., Hastings, J.S., Kane, T.J., Staiger, D.O. (2014). School Choice, School Quality and Postsecondary Attainment, *American Economics Review*, 104(3), 991-1013.
- Dobbie, W.S. & Fryer, R.G. (2016). Charter Schools and Labor Market Outcomes, *NBER Working Paper Series* 22502.
- Dobbie, W.S. & Fryer, R.G. (2013). The Medium-Term Impacts of High-Achieving Charter Schools on Non-Test Score Outcomes, *NBER Working Paper Series* 19581.
- Dynarski, S., Hyman, J., Schanzenbach, D.W. (2011). Experimental Evidence on the Effect of Childhood Investment on Postsecondary Attainment and Degree Completion. *NBER Working Paper No.* 17533.
- Egalite, A.J. & Wolf, P.J. (2016). A Review of the Empirical research on Private School Choice, *Peabody Journal of Education*, 91(4), 441-454.
- Evans, W.N., and Schwab, R.M. (1995). Finishing High School and Starting College: Do Catholic Schools Make a Difference? *Quarterly Journal of Economics*, 110(4), 941-74.
- Friendeway, M., Sawatka, K., Marcavage, W., Carney, K., Martinez, K., & Dauphin, P. (2015). *School choice yearbook 2014–15: Breaking down barriers to school choice*. Washington, DC: Alliance for School Choice.
- Furgeson, J., Gill, B., Haimson, J. Killewald, A., McCullough, M., Nichols-Barrer, I., Teh, B., Verbitsky-Savitz, N. (2012). Charter-School Management Organizations: Diverse Strategies and Diverse Student Impacts, The National Study of Charter Management Organization (CMO) Effectiveness, *Mathematica Policy Research*.
- Greene, J.P. (2016). The Weak Predictive Power of Test Scores, *Education Next*, 05/02/2016.
- Griliches, Z., & Mason, W.M. (1972). Education, income, and ability, *Journal of Political Economy*, 80(3), S74-S103.
- Heckman, J.J. & Krueger, A.B. (2002). Edited by Benjamin M. Friedman, *Inequality in America: What Role for Human Capital Policies?* Cambridge, MA: MIT Press.
- Heckman, J.J., Lochner, L.J., Todd, P.E. (2008). Earnings Functions and Rates of Return, *Handbook of the Economics of Education*, 1, 307-458.

- Jencks, C. (1985). How Much Do High School Students Learn? *Sociology of Education*, 58 (April), 128-35.
- Levin, H., Belfield, C., Muennig, P., Rouse, C. (2006). The Costs and Benefits of an Excellent Education for All of America's Children, *Center for Benefit-Cost Studies of Education at Teachers College, Columbia University, New York*.
- Levin, H.M. (1998). Educational Vouchers: Effectiveness, Choice, and Costs, *Journal of Policy Analysis and Management*, 17(3), 373-392.
- National Alliance for Public Charter Schools (NAPCS). (2016). About Charter Schools. Available at: <http://www.publiccharters.org/get-the-facts/public-charter-schools/>
- National Conference of State Legislatures (NCSL). (2016). School Vouchers. Available at: <http://www.ncsl.org/research/education/school-choice-vouchers.aspx>
- Neal, D. (1997). The Effect of Catholic Secondary Schooling on Educational Achievement, *Journal of Labor Economics*, 15(1), 98-123.
- Sass, T.R., Zimmer, R.W., Gill, B.P., Booker, T.K. (2016). Charter High Schools' Effects on Long-Term Attainment and Earnings, *Journal of Policy Analysis and Management*, 35(3), 683-706.
- Warren, J.R. (2011). Graduation Rates for Choice and Public School Students in Milwaukee, 2003-2009, *School Choice Wisconsin*.
- Wolf, P.J., Kisida, B., Gutmann, B., Puma, M., Eissa, N., Rizzo, L. (2013). School Vouchers and Student Outcomes: Experimental Evidence from Washington, DC, *Journal of Policy Analysis and Management*, 32(2), 246-270.